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TITLE:

SLR Station Recovery, Center of Frame Motion, and Time Varying Gravity

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ABSTRACT BODY:

Weekly station position estimates, beginning with 1993, are derived from the ITRF2008-based SLR processing of up to four satellites: Lageos1, Lageos2, Starlette, and Stella. Helmert parameters obtained from comparison of weekly SLR station positions and the a-priori SLRF2008 station complement are evaluated for geocenter motion and scale. Two methods for modeling time varying gravity are employed in the SLR satellite POD processing, with GGM03S serving as the static gravity field. Both methods forward model atmosphere gravity derived from 6-hour ECMWF pressure data. The standard approach applies an annual 20x20 field estimated from 4 years of GRACE data, and the IERS2003 recommended linear rates for C20, C30, C40, C21, and S21. The alternate approach uses a new set of low-order/degree 4x4 coefficients estimated weekly from SLR & DORIS processing to 10 satellites from 1993-2012. This experimental tvg4x4 model has been shown to improve the TOPEX, Jason-1, and Jason-2 altimeter satellite orbits. In this paper we apply the more detailed time-variable gravity modeling to the SLR satellite POD processing and subsequent reference frame analyses. For this study we will evaluate the orbit differences (periodic and secular) for the satellites concerned, characterize the impact on the station coordinate solutions, and the impact on reference frame parameters (geocenter and scale).

INDEX TERMS: [1229] GEODESY AND GRAVITY / Reference systems, [1217] GEODESY AND GRAVITY /